

COLUMBIA RIVER FROM POINT ADAMS TO TONGUE  
POINT; AND YOUNGS BAY, OREG.

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LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT ON  
PRELIMINARY EXAMINATION OF MAIN SHIP CHANNEL IN OR  
NEAR THE MOUTH OF COLUMBIA RIVER ON THE SOUTH OR  
OREGON SIDE FROM A POINT IN THE VICINITY OF POINT  
ADAMS TO A POINT A SHORT DISTANCE ABOVE TONGUE POINT;  
AND OF YOUNGS BAY TO A POINT 1 MILE ABOVE COUNTY  
BRIDGE.

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JULY 12, 1918.—Referred to the Committee on Rivers and Harbors and ordered  
to be printed, with illustration.

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WAR DEPARTMENT,  
*Washington, July 10, 1918.*

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief  
of Engineers, United States Army, of 8th instant, together with  
report of Col. George A. Zinn, Corps of Engineers, dated March  
29, 1918, with map, on a preliminary examination of "Main ship  
channel in or near the mouth of Columbia River on the southerly  
or Oregon side from a point in the vicinity of Point Adams along  
channel to or a short distance above Tongue Point, and of Youngs  
Bay from Columbia River channel to a point 1 mile above the county  
bridge, so as to give a depth of 40 feet at low tide," made under au-  
thority contained in the river and harbor act approved August 8, 1917.

Very respectfully,

NEWTON D. BAKER,  
*Secretary of War.*

WAR DEPARTMENT,  
OFFICE OF THE CHIEF OF ENGINEERS,  
*Washington July 8, 1918.*

From: The Chief of Engineers, United States Army.

To: The Secretary of War.

Subject: Preliminary examination of Columbia River from Point Adams to Tongue Point, and Youngs Bay, Oreg.

1. There is submitted herewith for transmission to Congress report dated March 29, 1918, with map, by Col. George A. Zinn, Corps of Engineers, on preliminary examination authorized by the river and harbor act approved August 8, 1917, of "Main ship channel in or near the mouth of the Columbia River on the southerly or Oregon side from a point in the vicinity of Point Adams along channel to or a short distance above Tongue Point, and of Youngs Bay from the Columbia River channel to a point 1 mile above the county bridge, so as to give a depth of 40 feet at low tide."

2. The existing project for improvement of the Columbia and Willamette Rivers below Portland provides for a main ship channel 30 feet deep and 300 feet wide. Between Point Adams and Tongue Point, a distance of about 10 miles, this channel is along the south or Oregon shore and passes in front of the principal wharves of Astoria below the Oregon-Washington Railroad & Navigation Co.'s wharf. The project dimensions are now available in this section of the channel. The improvement desired, as specified in the law, is an increase in depth to 40 feet, but the district engineer states that local interests have modified their request to embrace a channel 36 feet deep and approximately 800 feet wide. The principal interests to be benefited by the desired improvement are those located at Astoria and at Flavel, the latter being the terminus of the Great Northern Pacific Steamship Co. The commerce over the Port of Astoria docks in 1917 is reported at 30,624 tons, while that at Flavel in 1916 is given as 16,011 tons, compared with a total normal commerce on the river below Portland in seagoing vessels only of more than 2,000,000 tons. From a study of the statistics available relative to the commerce involved and the draft of vessels to and from this locality, the district engineer, who is also the division engineer, reaches the conclusion that the existing navigation facilities are sufficient for the present demands of commerce.

3. Youngs Bay is just below Astoria on the Oregon side of the Columbia River, about 9 miles above its mouth. From deep water in the river to the county bridge, a distance of about 3 miles, the channel depths at mean lower low water range from 9 to 17 feet, while above the bridge for a distance of 1 mile the depths range from 19 to 37 feet. The territory tributary to Youngs Bay is devoted chiefly to agriculture and dairying, and several industries, including two shipbuilding plants, are located on the bay. The present water-borne traffic is local and consists in the towing of log rafts and barges loaded with material and supplies for the shipyards and other plants. While the act ordering this examination specifies a depth of 40 feet, it appears that local interests will now be satisfied with a channel 18 feet deep and approximately 300 feet wide. In the opinion of the district engineer, the existing channel in Youngs Bay is adequate for the present and immediately prospective demands of commerce, and



he believes that the locality is not worthy of improvement by the Federal Government at this time.

4. This report has been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated June 12, 1918, concurring in the views of the district engineer.

5. After due consideration of the above-mentioned reports, I concur in the views of the district engineer and the Board of Engineers for Rivers and Harbors, and therefore report that the improvement by the United States of main ship channel in or near the mouth of the Columbia River on the southerly or Oregon side from a point in the vicinity of Point Adams along channel to or a short distance above Tongue Point, and of Youngs Bay from the Columbia River channel to a point 1 mile above the county bridge, so as to give a depth of 40 feet at low tide, is not deemed advisable at the present time.

W. M. BLACK, *Major General.*

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REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

[Second indorsement.]

The Board of Engineers for Rivers and Harbors.

JUNE 12, 1918.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The following is in review of the district engineer's report authorized by the river and harbor act of August 8, 1917, on preliminary examination of main ship channel in or near the mouth of the Columbia River, on the southerly or Oregon side, from a point in the vicinity of Point Adams along channel to or a short distance above Tongue Point, and of Youngs Bay from the Columbia River Channel to a point 1 mile above the county bridge, so as to give a depth of 40 feet at low tide.

2. The main ship channel from Point Adams to Tongue Point, a distance of about 10 miles, is along the south or Oregon shore. It follows closely along and in front of the principal wharves of Astoria below the Oregon-Washington Railroad & Navigation Co.'s dock. Above this dock the channel diverges and passes Tongue Point at a distance of about 2,200 feet from the shore. There is now available in the main channel from Point Adams to Tongue Point a depth of not less than 30 feet at mean lower low water for a width of not less than 300 feet. The average range of tide is about 7 feet.

3. Astoria has a population of about 12,000 inhabitants and is the center of the fishing, logging, lumber, and shipbuilding industry carried on at this locality. The city has built and owns a modern municipal wharf having a frontage on the harbor line of over 1,800 feet. Ocean vessels engaged in traffic with Portland are of comparatively moderate draft, very rarely exceeding 28 feet. Those using the port of Astoria have a draft of 20 to 22 feet. The tonnage handled on the Columbia River in 1916 amounted to 199,127 tons, exports and imports (foreign), and 2,094,465 tons domestic or coast-

wise. The amount reported as handled over the port of Astoria dock is 30,624 tons. While the investigation is for a depth of 40 feet at low tide, apparently local interests would now be satisfied with a depth of 36 feet. Existing navigable conditions and terminal facilities over the area under consideration are deemed sufficient for the present demands of commerce, and the necessity at this time for a greater depth is not apparent. The district engineer is, therefore, of the opinion that further improvement of the Columbia River at this point is not worthy of being undertaken by the Federal Government at this time.

4. Youngs Bay is located west of Astoria, about 9 miles above the mouth of the Columbia River. From deep water in the Columbia to the county bridge (about 3 miles) the channel depth at mean lower low water is from 9 to 17 feet. Above the county bridge for a distance of 1 mile the depth is from 19 to 37 feet. The average range of tide is about 7 feet. The territory tributary is devoted chiefly to agriculture and dairying. On the eastern side of the bay there are two shipbuilding plants, both engaged in the construction of wooden vessels. When launched, these vessels have a draft of from 10 to 12 feet. There are also two or three industrial plants in this vicinity.

5. The traffic on and through the bay is local, chiefly between the Astoria wharves and points on Youngs Bay and River above. The commerce consists in the towing of log rafts and barges loaded with materials and supplies for the shipyards and other plants. The amount of this tonnage is not given. A representative of the Port of Astoria states that while 40 feet in depth was first requested, on account of the existing war conditions this depth should at present be curtailed to 18 feet, with a channel width of 300 feet. The district engineer states that as the existing channel in Youngs Bay is deemed adequate for the present and immediately prospective demands of commerce, the additional improvement contemplated in the law is not considered worthy of being undertaken by the Federal Government at this time.

6. Interested parties were informed of the tenor of the district engineer's report and given an opportunity of submitting their views, but no communications on the subject have been received.

7. There has been provided in the Columbia River between its mouth and Portland a main channel having a minimum depth of 30 feet at mean low water. This channel is now available to the commerce of Astoria. The vessels now using the through channel have a greater draft than those engaged in traffic with Astoria. There is nothing to indicate that the existing facilities at this port are inadequate for present and prospective commerce.

8. The question of improving Youngs Bay and River from the Columbia River to a point 1 mile above the county bridge was reported upon under authority of the river and harbor act of July 27, 1916. It was then stated that existing commerce is fairly well accommodated by the present channel conditions and that there is no pressing need of improvement nor any definite prospect of an increase in commerce. The report was therefore unfavorable. Apparently conditions have not changed materially since that report was submitted, excepting perhaps that more wooden ships are being



built at the shipyards. As these vessels do not require a greater draft than naturally exists there is no apparent need of additional depth.

9. In view of the conditions described above the board concurs in the opinion of the district engineer, who is also the division engineer, that it is not advisable at this time for the United States to undertake any additional improvement in the main channel of the Columbia River from Point Adams to Tongue Point, or the improvement of Youngs Bay from the Columbia River channel to a point 1 mile above the county bridge.

10. In compliance with law the board reports that there are no questions of terminal facilities, water power, or other related subjects which could be coordinated with the suggested improvements in such manner as to render the work advisable in the interests of commerce and navigation.

For the board:

PETER C. HAINS,  
Major General, United States Army, Retired,  
Senior Member of the Board.

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PRELIMINARY EXAMINATION OF COLUMBIA RIVER AND YOUNGS  
BAY, OREG.

UNITED STATES ENGINEER OFFICE, SECOND DISTRICT,  
Portland, Oreg., March 29, 1918.

From: The District Engineer.

To: The Chief of Engineers, United States Army.

Subject: Preliminary examination of Columbia River and Youngs Bay, Oreg.

1. In compliance with instructions contained in department letter dated September 1, 1917, the following report is submitted on preliminary examination of main ship channel in or near the mouth of the Columbia River on the southerly or Oregon side from a point in the vicinity of Point Adams along channel to or a short distance above Tongue Point, and of Youngs Bay from the Columbia River channel to a point 1 mile above the county bridge so as to give a depth of 40 feet at low tide, provided for in section 4 of the river and harbor act approved August 8, 1917.

2. The Columbia River rises in British Columbia, flows southwesterly about 1,200 miles through the State of Washington and between Oregon and Washington, and empties into the Pacific Ocean 610 miles north of San Francisco Harbor and 160 miles south of the Straits of Juan de Fuca.

3. The main ship channel (see map herewith) in the estuary of the Columbia River from Point Adams, about 7 miles above the mouth, to Tongue Point, a distance of about 10 miles, is along and near the south or Oregon shore.

Beginning at a point about  $1\frac{1}{2}$  miles below Point Adams another channel follows along the north or Washington shore and extends easterly to a short distance beyond Point Ellice, in which the depths range up to 86 feet.

The estuary in the vicinity of the section of river under consideration is about  $3\frac{1}{2}$  miles wide between Point Adams and Chinook Point,

4 miles wide between Smith Point and Point Ellice, about 5 miles upstream, and  $4\frac{1}{2}$  miles wide between Tongue Point and Grays Point.

4. The south or main ship channel from Point Adams follows along the bank to and across Flavel Shoal, at the entrance to Youngs Bay, then along and in front of the docks east of Smith Point to the Oregon-Washington Railroad & Navigation Co.'s dock; from this point the channel diverges from the main shore and runs in a northeasterly direction across Upper Sands Shoal and the estuary to Harrington Point, on the Washington shore, passing about 2,200 feet northerly from Tongue Point.

5. Between Point Adams and Youngs Bay—about 2 miles—the bank generally is low and the ground swampy with numerous tidal sloughs. Youngs Bay at the entrance is about 3 miles wide,  $1\frac{1}{2}$  miles wide where the Spokane, Portland & Seattle Railroad crosses the bay near the mouth, and about  $\frac{1}{2}$  mile wide at the county bridge, 3 miles above the entrance. From Youngs Bay easterly to Tongue Point, about 5 miles, the mainland rises rapidly from water level to an elevation of 300 feet and over; along the water front and on the hill are located the business and residential districts, respectively, of the city of Astoria.

6. From Point Adams to Youngs Bay there is a channel with a minimum depth of 30 feet at mean lower low water, 1,000 feet wide, with depths ranging up to 52 feet; across Flavel Shoal the controlling depth is 30 feet, thence to the Oregon-Washington Railroad & Navigation Co.'s dock 30 feet deep, 1,200 feet wide, with depths ranging up to 76 feet; and across the Upper Sands Shoal the controlling depth is 30 feet, 300 feet wide. From this point to above Tongue Point the depths range from 30 feet to 83 feet, the distance between the 30-foot contours varying in width from 1,000 feet to 3,000 feet. The material in the main ship channel is composed principally of sand and silt. From the Oregon-Washington Railroad & Navigation Co.'s dock easterly to the United States buoy depot at Tongue Point the depths along and in front of the harbor line range from about 14 to 26 feet, and borings made in 1904 on this section of the harbor indicate a gravel and rock bottom overlaid with sand. The surface of the rock is from about 17 to 34 feet below mean lower low water. The average range of the tide is about 7 feet.

7. Harbor lines originally established and approved April 22, 1891, by the Acting Secretary of War extended westerly from the United States lighthouse buoy depot at Tongue Point to Tansy Point (Flavel Wharf), and included Youngs Bay and the lower portion of Youngs River and the Lewis and Clark River (Annual Report of Chief of Engineers, 1891, p. 3387). Harbor lines in front of Flavel were approved June 29, 1893, by the Secretary of War (Annual Report, Chief of Engineers, 1893, p. 3537), and in front of New Astoria (Hammond) to Fort Stevens Wharf December 18, 1895 (Annual Report, Chief of Engineers, 1896, p. 3320).

Modifications in the above harbor lines, approved by the Secretary of War, were made as follows: On the west side of Youngs Bay from the Lewis and Clark River to Flavel, May 21, 1896 (Annual Report, Chief of Engineers, 1896, p. 3322), from the Buoy Depot to the Oregon Railroad & Navigation Co.'s dock, December 4, 1903 (Annual Report, Chief of Engineers, 1904, p. 3577), and in the lines below Tongue Point and in the vicinity of Smith Point, September 3, 1913.



8. The river and harbor act of September 19, 1890, provided for a preliminary examination and survey of "The lower Willamette and Columbia Rivers, Oreg., with a view to securing 25 feet at low water from Portland to the mouth of the Columbia." The report was favorable. Dredging and dike construction was recommended for the river above Tongue Point and dredging in front of Upper Astoria. From here to the sea, the report states, "there is a good channel having a depth of 25 feet or more." The total estimated cost of the improvement was \$772,464. No estimate for maintenance is mentioned (H. Doc. No. 38, 52d Cong., 1st sess.). The project was adopted by the river and harbor act of July 13, 1892. The river and harbor act of August 7, 1894, provided for a survey of "Columbia River below Tongue Point, by way of the southern channel in front of Astoria." The report was favorable. Dredging a waterway in front of Astoria 25 feet deep and 250 feet wide at the bottom and the removal of the outer portion of the Sylvia de Grasse ledge were recommended at an estimated cost of \$121,550. (Annual Report, Chief of Engineers, 1895, p. 3605.) This project was adopted by the river and harbor act of June 3, 1896.

9. The river and harbor act of March 3, 1899, provided for a preliminary examination and survey of "Lower Willamette and Columbia Rivers below Portland, Oreg.: Survey and estimate of the cost of obtaining a channel depth of 25 feet at low water from Portland to the mouth of the Columbia River." The report was favorable. Dredging and the construction of regulating works about Tongue Point and dredging below Tongue Point were recommended at a total estimated cost of \$2,971,300 and \$50,000 for annual maintenance. (H. Doc. No. 673, 56th Cong., 1st sess.) The project was adopted by the river and harbor act of June 13, 1902. Referring to the channel below Tongue Point, the district officer states: "During the past 8 or 10 years the channel by way of the buoy depot and Sylvia de Grasse Reef has shown some deterioration. Moreover, the channel can not be made satisfactory at moderate cost. It is narrow and the presence of the reef is an ever-present menace to navigation. Any broad and sufficient channel along this shore, if dredged through, could not be maintained except by large annual expenditures, and especially is this true for any channel so far from the shore as to leave the reef on one side."

The location of the new channel, as recommended by the district officer, extends from the Oregon-Washington Railroad & Navigation Co.'s Dock northeasterly across the Upper Sands Shoal to the deep water below Tongue Point.

10. The river and harbor act of March 3, 1905, provided for a preliminary examination of "Astoria Harbor," Oreg. The act, however, does not state the character and extent of the proposed improvement, but in a communication from the Astoria Chamber of Commerce it appears the following improvements were desired: "A deeper and broader channel between Smith Point and Tansy Point, so as to admit the safe anchoring at all stages of the tide of the largest vessels which come into the Columbia River.

"A deeper channel between the Oregon Railroad & Navigation Co.'s wharf and the United States buoy depot.

"A wider channel off Ninth Street."

The report was unfavorable (H. Doc. No. 216, 59th Cong., 2d sess.).

11. The river and harbor act of March 3, 1909, provided for a preliminary examination and survey of "Columbia and lower Willamette Rivers below Portland, with a view to securing a permanent channel 30 feet in depth and of sufficient width." The report was favorable. Dredging, the construction of dikes and revetments between Portland and Brookfield at the head of the estuary, and dredging between Brookfield and Fort Stevens were recommended. The width proposed for all dredged channels is 300 feet, 30 feet in depth except in the estuary from Brookfield to Fort Stevens, where a depth of about 26 feet at the mean of the lower low waters by utilizing the tides is thought to be ample for many years to come. The total estimated cost of the improvement is \$3,770,000 and \$350,000 annually for maintenance. (H. Doc. No. 1278, 61st Cong., 3d sess.) Cooperation by the port of Portland, which received the approval of the Secretary of War June 29, 1915, would reduce this probable first cost to the United States, it is thought, to about \$3,000,000 and annual maintenance to about \$300,000. The project was adopted by the river and harbor act of July 25, 1912.

12. There appearing to be some doubt as to the project depth in the estuary between Brookfield and the mouth, the following resolution, dated February 3, 1917, was submitted to the Board of Engineers for Rivers and Harbors by the Committee on Commerce of the Senate: "That the Board of Engineers for Rivers and Harbors be, and they are hereby, requested to examine and review its report on the survey of Columbia River (printed in H. Doc. No. 1278, 61st Cong., 3d sess.) with reference to the depth of water on the lower Columbia River between Brookfield and the mouth thereof, with a view to ascertaining and reporting as to the propriety of increasing the project depth from 26 to 30 feet at low-water mark so as to conform to the project depth between Portland and Brookfield, which is now 30 feet at mean low water."

13. The board, in submitting its report, March 14, 1917, on the resolution, states: "The general character of the seagoing commerce and of the vessels used in this traffic are the same for the entire reach of the Columbia River from its mouth to the city of Portland, and the same depth is therefore required. It appears that this can be provided and maintained without increasing the estimate for maintenance as now authorized. It is therefore deemed advisable to increase the project depth, as now stated, from 26 feet to 30 feet at mean low water below Brookfield to give a project depth of 30 feet from Portland to the mouth."

14. The Chief of Engineers, on March 29, 1917, concurred in the views of the board and recommended to the Committee on Commerce, United States Senate, "that in the next appropriation for maintenance of the Columbia and lower Willamette Rivers below Portland, Oreg., authority be given to restate the project so as to provide a depth of 30 feet at mean low water from Portland to the mouth." (S. Doc. No. 57, 65th Cong., 1st sess.)

15. The river and harbor act of August 8, 1917, contained the following item: "The Secretary of War is directed to make a survey and submit a report to Congress with a view to securing a channel 35 feet deep in the lower Columbia and Willamette Rivers below Portland, Oreg." The act also provided: "That no survey herein



provided for shall be made until after the close of the war with Germany except such as the Secretary of War shall direct." The report was unfavorable to a survey before the close of the war with Germany, as, in the opinion of the district engineer, "the commerce of the Columbia River will not be seriously injured by a delay in making the surveys of the lower Columbia and Willamette Rivers called for by the act of August 8, 1917." The views and opinions of the district engineer and the Board of Engineers were concurred in by the Chief of Engineers and approved November 26, 1917, by the Assistant Secretary of War.

16. Astoria, the principal town on the estuary, has a population of about 12,000 inhabitants, and is the center of the fishing, canning, logging, lumber, and shipbuilding industries carried on at this locality. A portion of the water front westerly from the Clatsop Mill Co. dock has recently been bulkheaded and the space between the bulkhead and main shore filled in with material pumped from the bed of the stream. Most of the docks and wharves owned by the cannery, packing, flouring mills, oil, and transportation companies are located westerly from the Oregon-Washington Railroad & Navigation Co.'s dock, and near Smith Point are located the port of Astoria docks. East of the Oregon-Washington Railroad & Navigation Co.'s dock to Tongue Point are located the Spokane, Portland & Seattle Railroad Co.'s dock, the Clatsop Mill Co.'s dock, Hammond Lumber Co.'s dock, some cannery docks, and several fish-receiving stations.

17. The above structures, except the port of Astoria docks, are constructed of piling and lumber, privately owned, and most of them have rail connection with the Spokane, Portland & Seattle Railroad, which parallels the water front from Tongue Point to Smith Point, then across Youngs Bay, through Warrenton and Flavel, to Fort Stevens.

18. The terminals owned and operated by the port of Astoria, located near Smith Point on the ship channel of the Columbia River, have a frontage of over 1,800 feet on the harbor line and extend back to the right of way of the Spokane, Portland & Seattle Railroad Co.

19. The docks are built on the pier and slip plan at a cost of \$1,250,000, and are equipped with modern appliances for handling freight between boat and rail and vice versa. The trackage facilities on both piers are under the control of the port of Astoria and connect with the main line of the Spokane, Portland & Seattle Railroad Co. On pier No. 1 is located an elevator for handling sacked grain; a reinforced-concrete plant, consisting of 64 storage tanks, with a total capacity of 1,000,000 bushels of bulk grain, is nearing completion; and there is also under construction a reinforced-concrete plant for the handling and transfer of bulk grain, with suitable railroad connections for receiving and discharging cars from the main yard. This plant is to be equipped with shipping facilities for loading bulk grain at the rate of 15,000 bushels per hour. Pier No. 2 is used for heavy freight, and is equipped with a revolving locomotive crane having a maximum capacity of 50 tons, coal bunkers of 3,000 tons capacity, and a modern marine machine shop.

20. The terminals of the Great Northern Pacific Steamship Co. are located at Flavel and connect with the Spokane, Portland &

Seattle Railroad at this point. The steamers *Great Northern* and *Northern Pacific*, until they were recently commandeered by the Federal Government, operated on a regular schedule between Flavel and San Francisco. These boats have a loaded draft of about 23 feet and were engaged principally in the passenger business. The cargo capacity of each boat is about 4,000 tons, but the amount of freight carried during the calendar year 1917 averaged, it is understood, about 964 tons per boat each way.

21. The steamers *Rose City* and *Beaver*, with a maximum draft of about 19 feet and 21 feet, respectively, carrying freight and passengers, operate on a regular schedule between Portland and San Francisco, calling at the Oregon-Washington Railroad & Navigation Co.'s dock at Astoria both ways, and vessels loaded at the Hammond Lumber Co. mill near Tongue Point and the oil tankers which discharge their cargo at the Standard Oil Co. dock, below the Oregon-Washington Railroad & Navigation Co. dock, have a maximum draft of about 26 feet and 25 feet, respectively.

22. Following is a list and draft of vessels using the port of Astoria docks during the years 1916 and 1917:

Type of vessel.	1916	Draft, full load.	1917	Draft, full load.
		<i>Feet.</i>		<i>Feet.</i>
Sailing vessels.....	2	20	6	20
Steam schooners.....	31	20	12	20
Motor ships.....			7	22
Steamships.....	7	23		
	40		25	

The following table shows the number of vessels with a draft of 25 feet and over leaving Portland since the year 1907:

Draft.	Number of vessels.											
	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	Total.
25 feet and under 26 feet..	5	3	4	2	3	6	21	16	8	1	4	73
26 feet and under 27 feet..					1		10	1	7		2	21
27 feet and under 28 feet..						3		1		1		5
28 feet and over.....									1		2	3
Total.....	5	3	4	2	4	9	31	18	16	2	8	102

The two vessels of over 28-foot draft, shown in 1917 column, were built at Portland in 1917 and were transferred for service on the Atlantic coast.

23. Regarding the character and amount of commerce, whether domestic or foreign, the type and draft of vessels that would warrant the proposed improvement, Mr. Bartlett, chief engineer and manager of the port of Astoria, states: "I have not been able to accumulate as much specific data regarding this project as I had intended, both on account of the press of work in our own office and because the various industries in the vicinity being short of help are loath to spare the necessary time to accumulate concise and definite statistics as to the volume of business in the district," and it is, of course,



needless to say that at this time we can not cite the steamship lines making the Columbia River a port of call, for which there is not sufficient water. This, however, is on account of war conditions, which justly demand their transfer to the Atlantic seaboard.

24. The question of the proposed improvement was taken up with the port of Astoria, at whose instigation, it is understood, the item was introduced and inserted in the act. Mr. R. R. Bartlett, in reply, states: "In our first request we asked for a depth of channel of 40 feet, but feel that on account of the just and urgent war need for the immediate future that such work should be curtailed so as only to meet necessities. Therefore, should you feel warranted in making such advice, I feel confident that the commission would highly appreciate a recommendation which would make the request a separate project from the upper Columbia River, which could then include Youngs Bay, allowing this district 36 feet of water in main channel from Point Adams to Tongue Point, having approximately a width of 800 feet. \* \* \*

The tonnage on the Columbia River for the calendar year 1916 is as follows:

	Short tons.	Value.
Exports and imports (foreign).....	199,127	\$6,526,652
Domestic or coastwise.....	2,094,465	55,442,522

25. The foreign commerce was principally barley, coal, flour, lumber, paper, rice, seeds, sulphur, and wheat, and the domestic commerce included asphaltum, cement, flour, fruits and vegetables, grain (all kinds), logs (rafted), lumber, merchandise, mill feed, oil (fuel and refined), paper, salt, sugar, and miscellaneous freight. The greater portion of the foreign commerce, it is understood, was consigned to and from Portland; and according to statistics furnished at that time by Mr. Gramms, assistant secretary of the Astoria Chamber of Commerce, 16,011 tons of the domestic tonnage, exclusively of oil shipments, was handled at Flavel during the same period.

26. Commercial statistics showing the amount of commerce to and from Astoria in seagoing vessels for the calendar year 1917 are not yet available, and it is thought there will be no material increase over the preceding year on account of the withdrawal of boats and the decrease in shipping due to the present war.

The following table shows the character and amount of tonnage over the Port of Astoria docks in 1917:

	Tons.
Ship construction materials and supplies.....	3,482
Logging equipment and machinery.....	3,252
Coal.....	1,600
Grain.....	10,734
Salmon (canned).....	2,014
Cement.....	400
Asphalt.....	877
Miscellaneous.....	5,265
Lumber.....	3,000
Total.....	30,624

27. In view of the statistics submitted relative to the commerce and draft of vessels to and from this locality, the existing navigable conditions and terminal facilities over the area under consideration are deemed sufficient for the present demands of commerce, the necessity, at this time, for a depth of 40 feet of water is not apparent. No definite information has been submitted by the parties interested in the proposed work, relative to any prospective development in the off-shore traffic or of any probable increase in the draft of vessels using this port when normal shipping conditions again are attained, that would require a channel with such a depth.

28. The item in the act specifically refers to the main ship channel, but as the improvement of this channel from the Oregon-Washington Railroad & Navigation Co. dock easterly would not materially benefit the local off-shore shipping, it is reasonable to assume that the improvement of the channel along the line of docks to Tongue Point was contemplated and desired by the parties at whose instigation the item was introduced.

29. To obtain a channel 40 feet deep, 800 feet wide, along the line of the main ship channel from Point Adams to above Tongue Point would require the removal of approximately 7,800,000 cubic yards of sand and silt, and to obtain a channel with similar dimensions from Point Adams along the south shore and in front of the docks to Tongue Point would require the removal of about 2,000,000 cubic yards of rock and hard material and 9,000,000 cubic yards of sand. The cost of improving either of these channels to the above extent would be excessive and not justified by the present or prospective demands of commerce at this locality, and in my opinion is not deemed necessary or worthy to be undertaken by the Federal Government at this time.

30. Youngs Bay is located west of Astoria on the Oregon side of the Columbia River, about 9 miles above its mouth. The entrance to the bay on a line with the general trend of the main bank of the Columbia River is about 3 miles wide,  $1\frac{1}{2}$  miles wide at the site of the Spokane, Portland & Seattle Railroad bridge, near the mouth, and about one-half mile wide at the county bridge,  $1\frac{1}{2}$  miles above the railroad bridge. From deep water in the Columbia River to the county bridge (about 3 miles) the channel depths at mean low or low water range from 9 to 17 feet; above the county bridge for a distance of 1 mile the depths range from 19 to 37 feet, with shallow depths over the remainder of the bay.

31. The average rise of tide is about 7 feet. The bed of the bay is composed principally of sand and silt. The left bank of the bay is low and swampy and the right bank is a high, rocky peninsula, on which is located the city of Astoria. The upper portion of the bay, which is used as an anchorage ground for schooners and other vessels, is sheltered and well protected from prevailing storms. The controlling depth at extreme low water is about 7 feet, at mean lower low water 9 feet, and at highest tides about 18 feet. The Spokane, Portland & Seattle Railroad bridge crosses Youngs Bay near its entrance and the county highway bridge about  $1\frac{1}{2}$  miles farther upstream. Both of these bridges are pile trestles with steel draws. The railroad bridge has two clear openings, each 130 feet wide, and a vertical clearance of about 20 feet above mean lower low water.



Plans for its reconstruction, approved June 13, 1916, by the Acting Secretary of War, provided for two clear openings, each 150 feet wide, and a vertical clearance of 18 feet above the same datum. The county bridge has two clear openings of 120 feet each and a vertical clearance of about 20 feet also above the same datum.

32. The streams emptying into Youngs Bay are Youngs River, at the upper end of the bay, the Lewis and Clark River, on the south bank midway between the two bridges, and the Skipanon Creek, a smaller stream, near the entrance to the bay. The Klaskanine River on the right bank empties into Youngs River about 7 miles above the county bridge. These rivers rise in the Coast Range and are navigable for some distance above their mouths, while the upper sections are mountain streams and not susceptible of improvement for navigation purposes.

33. On Youngs River light-draft navigation extends to the McGregor and Malone "Rollway," about 2 miles above the mouth of the Klaskanine River, and on the Klaskanine River to Olney, the head of navigation, a small town about  $1\frac{1}{2}$  miles above its mouth, where the county road to Astoria crosses the river. The depths on the navigable portion of Youngs River range from 4 to 25 feet, on the Klaskanine River from 3 to 11 feet, on the Lewis and Clark River from 4 to 20 feet, and on the Skipanon Creek the controlling depth is about  $3\frac{1}{2}$  feet at low tide.

34. In connection with the establishment of harbor lines at Astoria Harbor the Acting Secretary of War, on April 22, 1891, approved harbor lines in Youngs Bay and in the lower portions of Youngs and Lewis and Clark Rivers (Annual Report of the Chief of Engineers, 1891, p. 3388). A modification of the harbor lines on the west side of Youngs Bay was approved by the Secretary of War May 21, 1896 (Annual Report of the Chief of Engineers, 1896, p. 3322).

35. The territory tributary to Youngs Bay is devoted chiefly to agriculture and dairying. On the south and west of the bay the bottom lands are gradually being reclaimed by diking and the land back to the foothills is being developed for grazing and dairying purposes. The uplands, where not under cultivation, are covered with brush and timber. Cereal crops are not raised to any great extent. Logging operations are carried on extensively along and adjacent to the upper reaches of Youngs and the Klaskanine Rivers, respectively.

36. On the east side of the Bay, Wilson Bros. Shipbuilding Co. plant is located just above the railroad bridge, and the McEachern Ship Co. plant above the county bridge, both of which plants are engaged in the construction of wooden vessels. The former plant has a capacity of 8 ways and the latter 10 ways. These vessels have a draft when launched from about 10 to 12 feet and a loaded draft of about 22 feet.

37. Above the McEachern shipyard the pulp and paper manufacturing plant of the Astoria Pulp & Paper Co. is located, and also the Frans Kankkonen factory for the manufacture of a compound used in the sealing of salmon cans. Adjacent to the Skipanon Creek near Warrenton are the Hammond Lumber Co. mill and the Warrenton Clay Products plant for the manufacture of sewer pipe, drain and building tile. To provide these plants with water transporta-

tion, it is understood a channel with a depth of about 20 feet at low water is to be dredged by the port of Astoria with its 20-inch suction dredge in Skipanon Creek and through the sand flats to the Columbia River. These plants also have connection with the Spokane, Portland & Seattle Railroad.

38. The river and harbor act approved September 19, 1890, provided for a preliminary examination of Youngs Bay Channel from the ship channel of the Columbia River to the head of Youngs Bay, a distance of  $1\frac{1}{2}$  miles, with a view to improving the same by dredging, so as to secure a depth of 18 feet at low tide. The report was unfavorable. (H. Ex. Doc. No. 67, 51st Cong., 2d sess.)

39. The river and harbor act approved July 25, 1912, provided for a preliminary examination of Youngs Bay and River, Oreg. No project depth was stated in the act, but it appears that the item calling for this examination was inserted in the act at the request of the Representative in Congress from the district concerned with a view to securing a 25-foot channel at low tide from the Columbia River up to a point where the center line of sections 17 and 20, township 8 north, range 9 west Willamette meridian, Oregon, crosses Youngs River. The report was unfavorable. (H. Doc. No. 1386, 62d Cong., 3d sess.)

40. The river and harbor act approved July 27, 1916, provided for a preliminary examination of "channel of Youngs Bay from the main ship channel of the Columbia River to a point 1 mile above County Road Bridge." No project depth or width was stated in the act, but the Astoria Chamber of Commerce stated "that the consensus of opinion of those firms now located on Youngs Bay is that the channel should be dredged to not less than 500 feet in width and to a depth of 30 feet at low tide." The report was unfavorable. (H. Doc. No. 747, 65th Cong., 2d sess.)

41. The traffic on and through the bay is local, chiefly between Astoria and points on Youngs Bay and River and to Olney on the Klaskanine River. The commerce also consists in the towing of log rafts and barges loaded with material and supplies for the shipyards and other plants. A considerable amount of produce is hauled to Astoria by the farmers, as the roads are in good condition and it is a shorter and quicker route than by water.

42. There are no railroad terminals or public docks on the bay, but considerable frontage is available for such purposes. The port of Astoria docks and principal wharves are located on the main ship channel of the Columbia River east of Smith Point.

43. There is no water power susceptible of development which could be coordinated to advantage with any plan of improvement on Youngs Bay or on the section of the main channel of the Columbia River under consideration.

44. The question as to the need or requirement for a channel 40 feet deep through Youngs Bay was taken up with the port of Astoria, at whose instigation it is understood the item was introduced and inserted in the act. Mr. R. R. Bartlett, chief engineer and manager of the port of Astoria, in reply states: "In our first request we asked for a depth of channel of 40 feet, but feel that on account of the just and urgent war needs for the immediate future that such work should be curtailed so as only to meet necessities, \* \* \*" and then



suggests "an 18-foot depth of water in Youngs Bay approximately 300 feet wide from the Columbia River channel to above the county drawbridge."

45. The raw material and finished products handled by the Astoria Pulp & Paper Co. amount to approximately 50 tons per day, and the annual output of the Frans Kankkonen plant to about 1,800 tons, which is shipped by rail; a similar amount, it is stated, would be shipped by boat if steamship lines were established between Astoria, Seattle, Alaskan, and Siberian ports.

46. The necessity for a channel depth of 40 feet in Youngs Bay based on the present or prospective demands of commerce is not apparent, and, at this time, there appears to be no material change in conditions since the previous report was submitted to warrant such a depth. The item in the act does not state the width of the proposed improvement, but assuming a width of 300 feet, the project width for the dredged channels in the Columbia River, the amount of material to be removed to obtain a channel 40 feet deep from the main channel of the Columbia River through Youngs Bay to a point 1 mile above the county bridge would be approximately 6,000,000 cubic yards, the cost of which would not be justified by the present conditions.

47. As the existing channel in Youngs Bay is deemed adequate for the present and immediate prospective demands of commerce, the improvement of Youngs Bay so as to give a depth of 40 feet at low tide, as contemplated in the item, is not considered necessary in the interests of navigation, and, in my opinion, is not worthy to be undertaken by the Federal Government at this time.

48. Accompanying this report is a map of Columbia River from Point Adams to Tongue Point and of Youngs Bay from the Columbia River to about 1 mile above the county bridge.

GEO. A. ZINN,  
*Colonel, Corps of Engineers.*

[For report of the Board of Engineers for Rivers and Harbors, see p. 3.]

